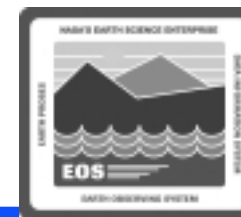


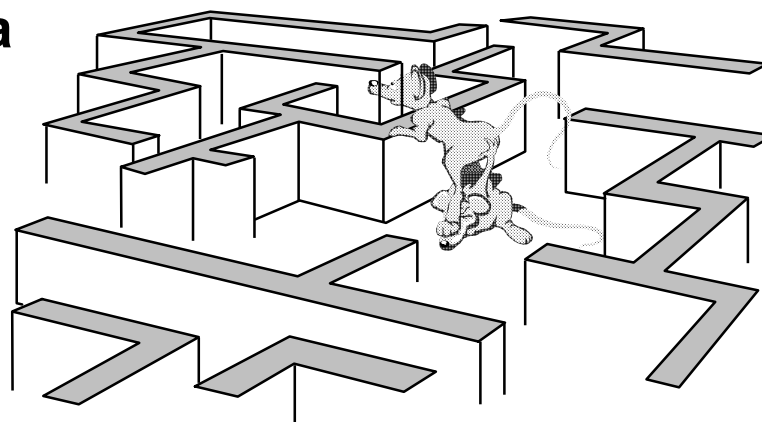
ARCHIVE PROCESSING

ECS Release 5B Training

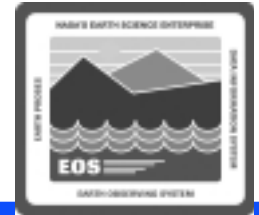
Overview of Lesson



- **Introduction**
- **Archive Processing Topics**
 - Archive Hardware and Software
 - Start and Shut Down AMASS
 - Archive Resources and Management
 - Insert and Retrieve Data
 - Load Archive Media
 - Backup and Restore Archive Data
 - AMASS Graphical User Interface
 - Monitor Archive System and Respond to Fault Notification
- **Practical Exercise**

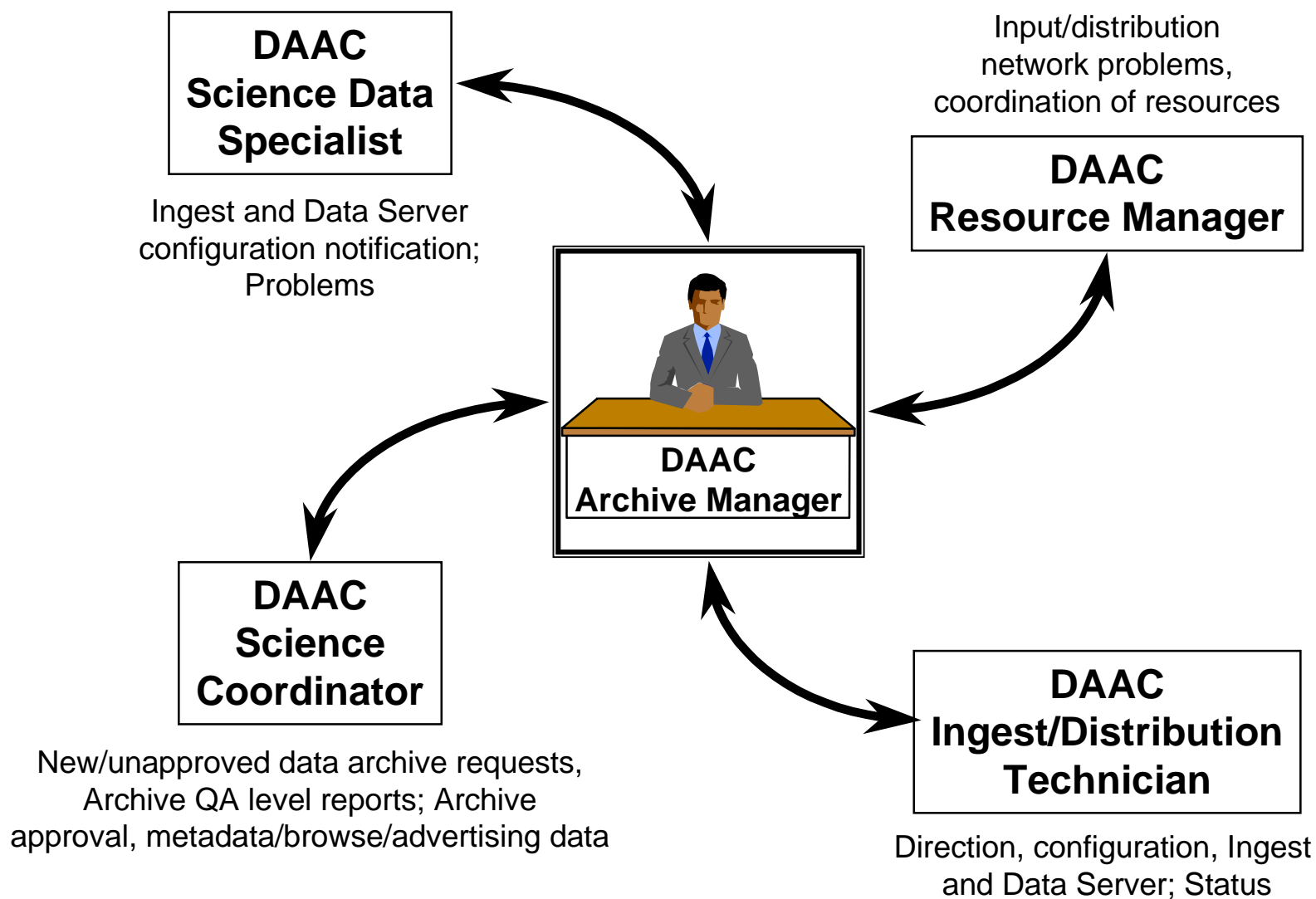
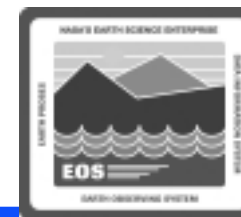


Objectives

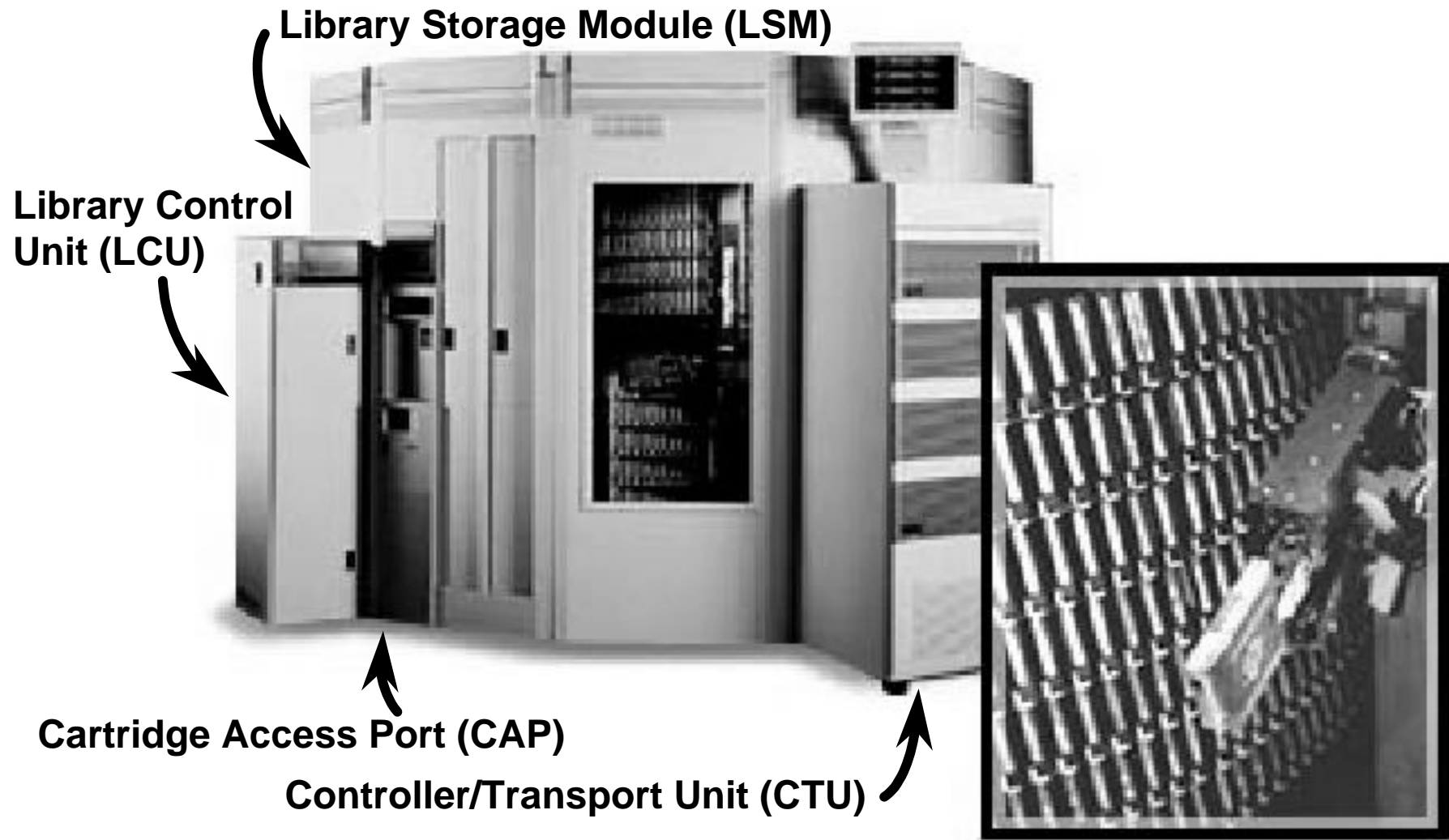
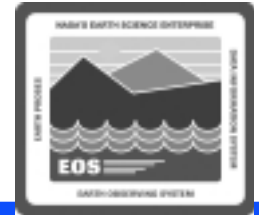


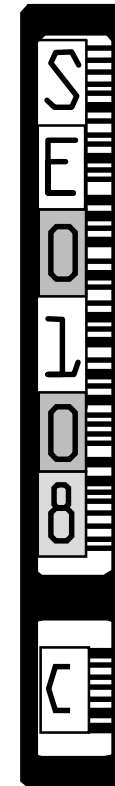
- **Overall: Proficiency in Archive Processing**
 - Describe Archive Manager roles and responsibilities
 - Identify and describe Archive storage resources
 - Start and shut down AMASS
 - Describe archive storage element relationships and archive resource management
 - Purge expired files from pull monitor cache
 - Load and unload cartridges
 - Insert/retrieve data
 - Delete files from the archive
 - Backup archive data
 - Restore archive data
 - Use the AMASS Graphical User Interface
 - Monitor archive system and perform fault notification

DAAC Archive Manager Interfaces



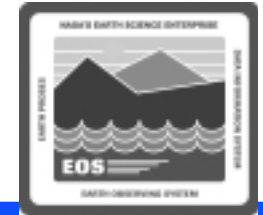
STK Powderhorn Data Storage



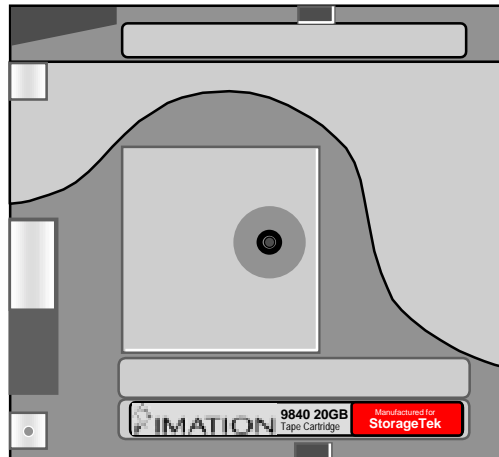


6
625-CD-510-002

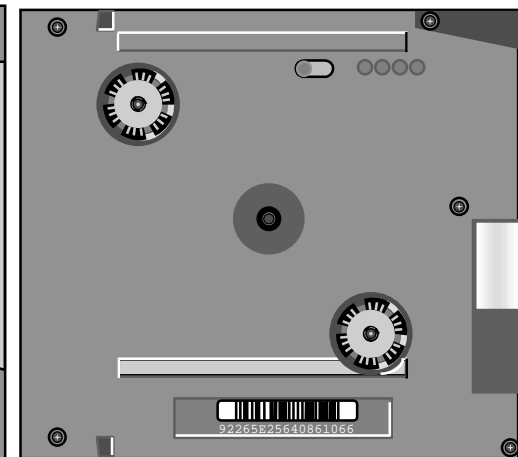
9840 Tape System for Browse Data



9840 Tape
Drive



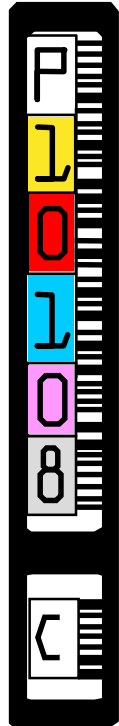
Front



Back

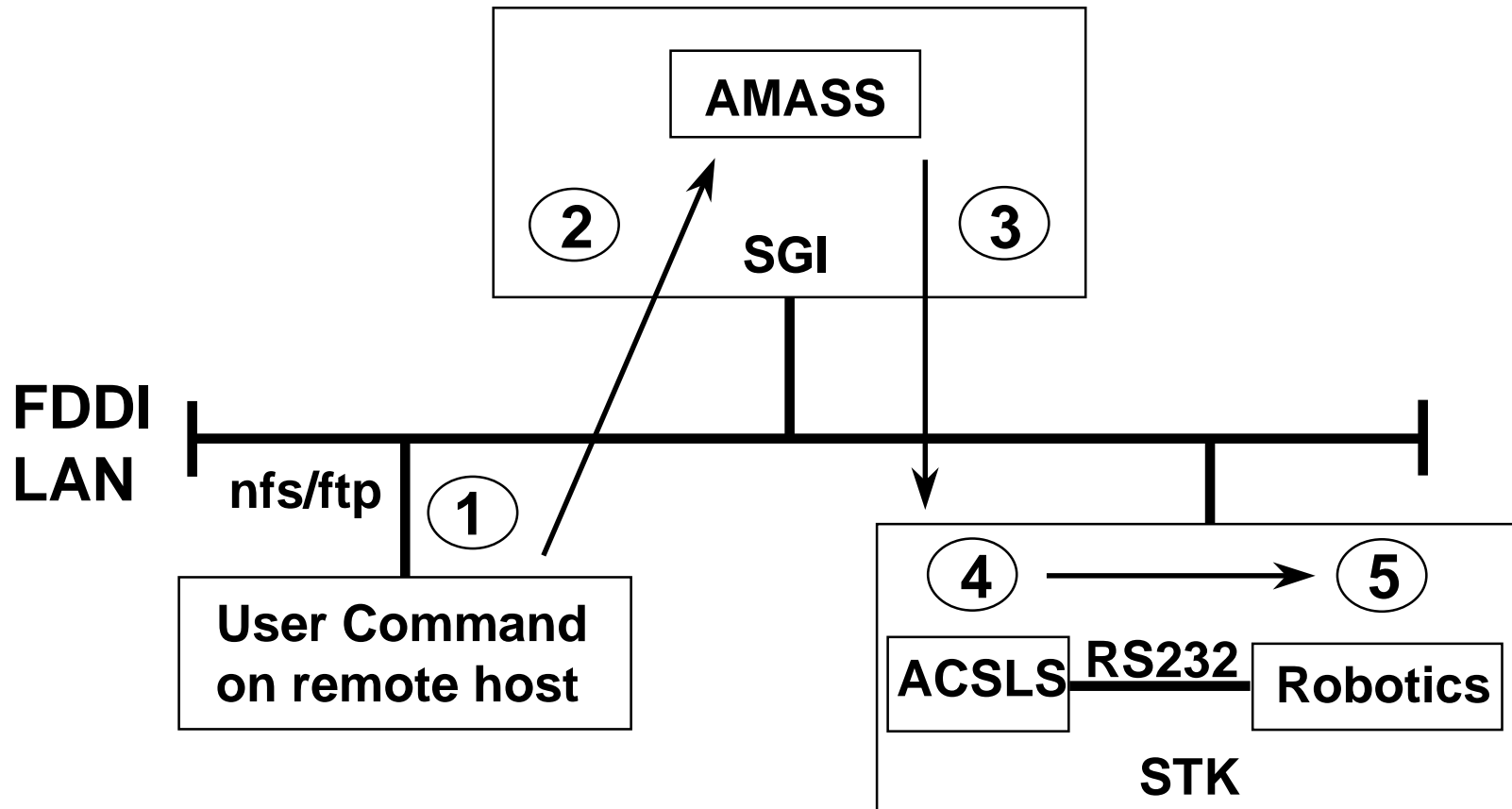
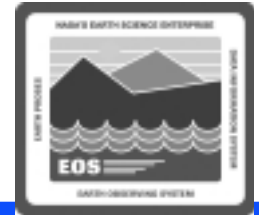
9840 Tape Cartridge

- 10 MB/sec uncompressed sustained data transfer rate
- 20 MB/sec compressed sustained data transfer rate
- 80 GB capacity per cartridge (compressed)
- Mid-point load for rapid search/access



End View with
Barcode

AMASS Control Path



Automated Cartridge System Library Software (ACSLS)

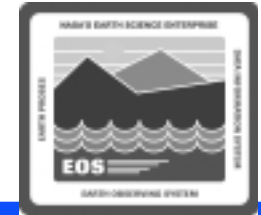
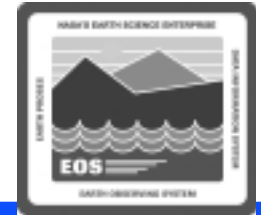


Table 1. ACSLS Command Reference

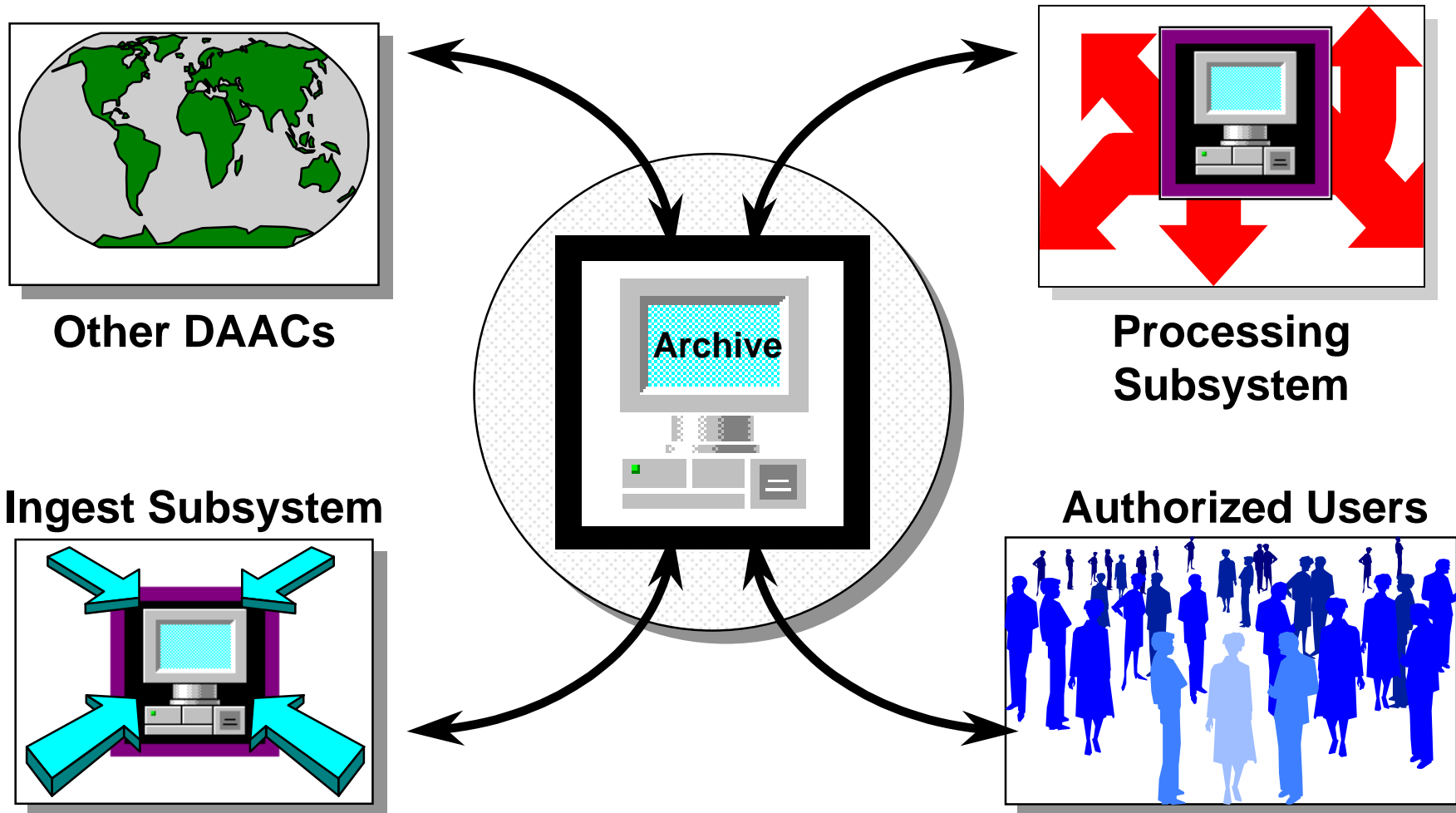
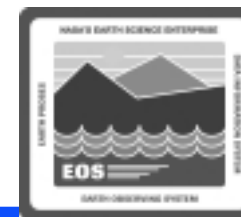
Command	Function
audit	Creates or updates the database inventory of the volumes in a library component.
cancel	Cancels a current or pending request.
clear lock	Removes all active and pending locks on transports or volumes
define pool	Creates or modifies scratch pools.
delete pool	Deletes empty scratch pools.
dismount	Dismounts a volume.
eject	Ejects one or more volumes from the Automated Cartridge System (ACS).
enter	Sets a Cartridge Access Port (CAP) to enter mode.
idle	Stops ACSLS from processing new requests.
lock	Locks (dedicates) a volume or transport to a user.
logoff	Exits the command processor.
mount	Mounts a data or scratch volume.
query	Displays the status of a library component.
set	Sets various attributes of different library components.
show	Displays your lock ID or user ID.
start	Starts ACSLS request processing.
unlock	Removes active locks on volumes or transports.
vary	Changes the state of an ACS, LSM, CAP, transport, or port.
venter	Enters one or more volumes with missing or unreadable labels into the ACS.

Automated Cartridge System Library Software (ACSLS) (Cont.)

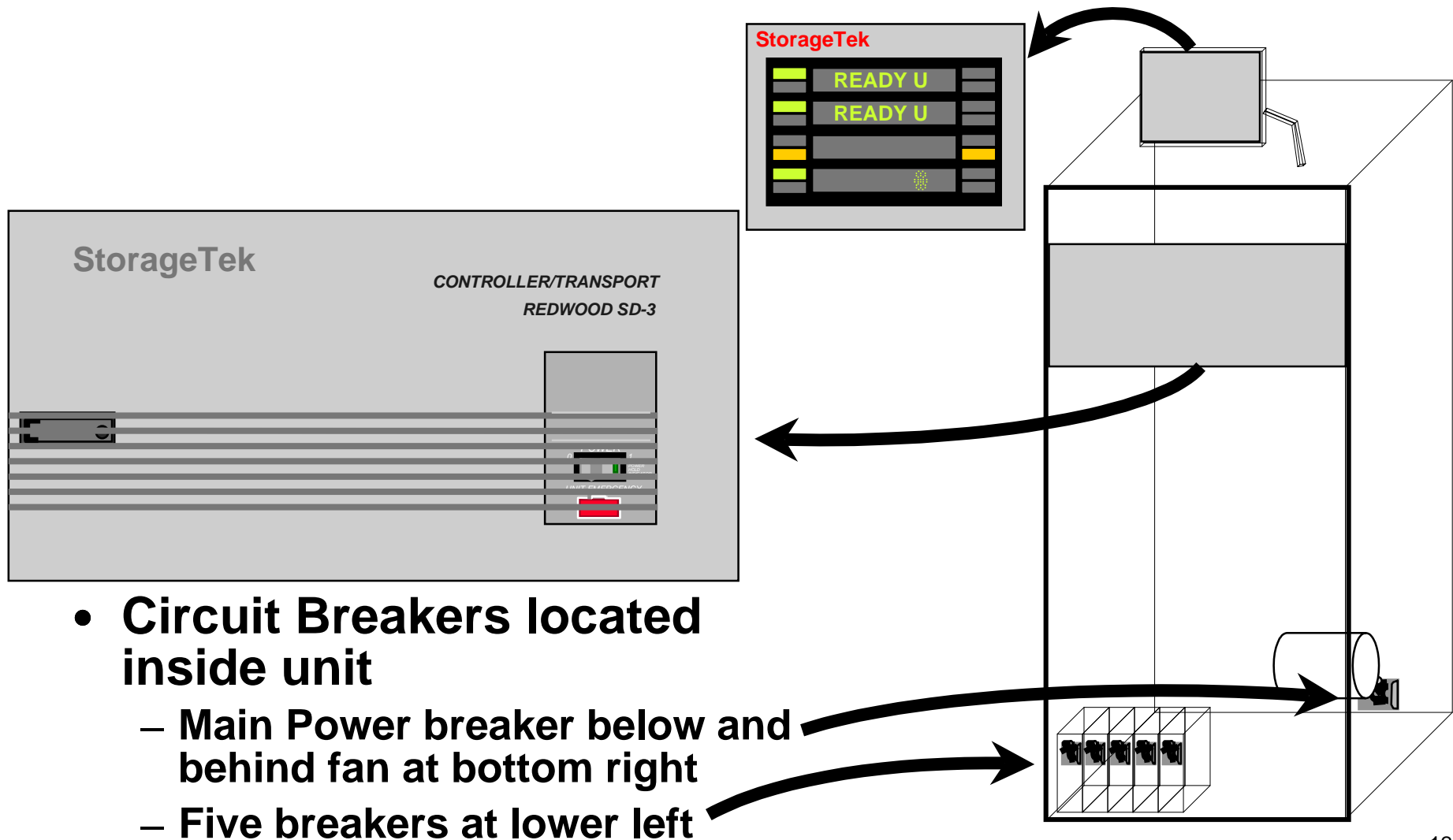
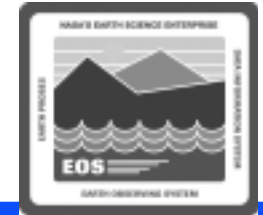


- **General Command Syntax:**
 - `command type_identifier state [options]`
- **Frequently used commands:**
 - `query`, `vary`, `enter`, `eject`
- **Utilities:**
 - `bdb.acsss` -- back up the ACSLS database
 - `kill.acsss` -- terminate ACSLS
 - `rc.acsss` -- start and recover ACSLS
 - `rdb.acsss` -- restore the ACSLS database
 - `volrpt` -- create a volume report
 - `db_command` -- start/stop Oracle database
- **User Ids:**
 - `acssa` -- enter commands
 - `acsss` -- run utilities from UNIX

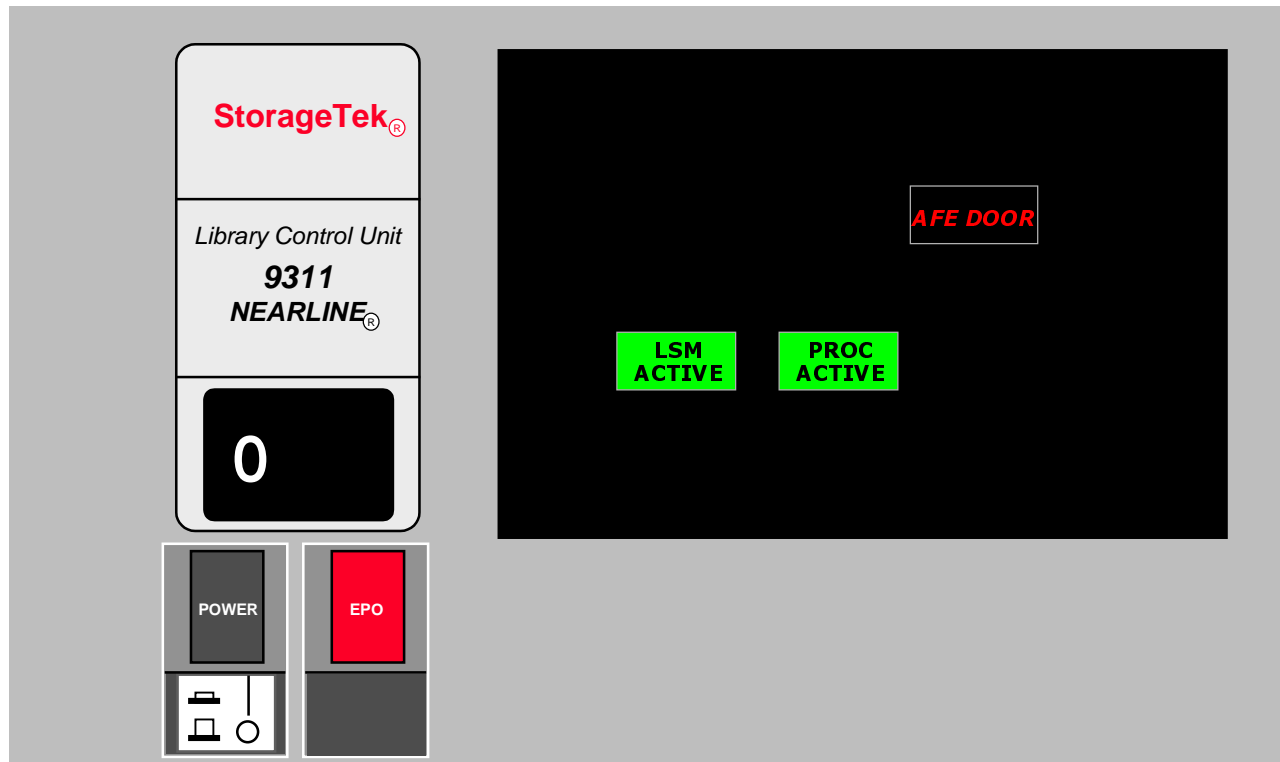
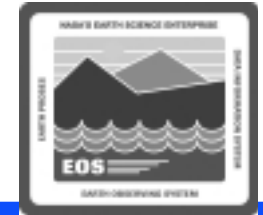
Sources and Uses of Archive Data



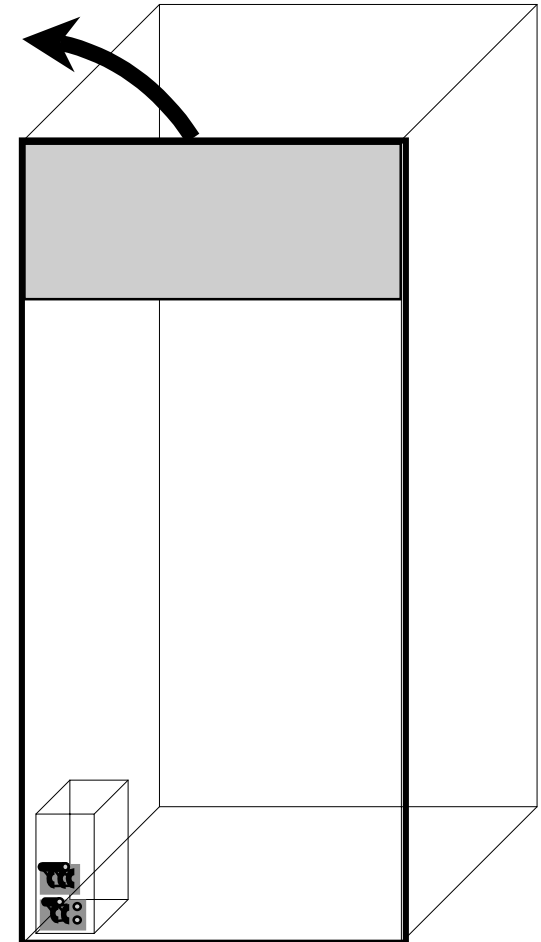
STK Controls/Displays: CTU



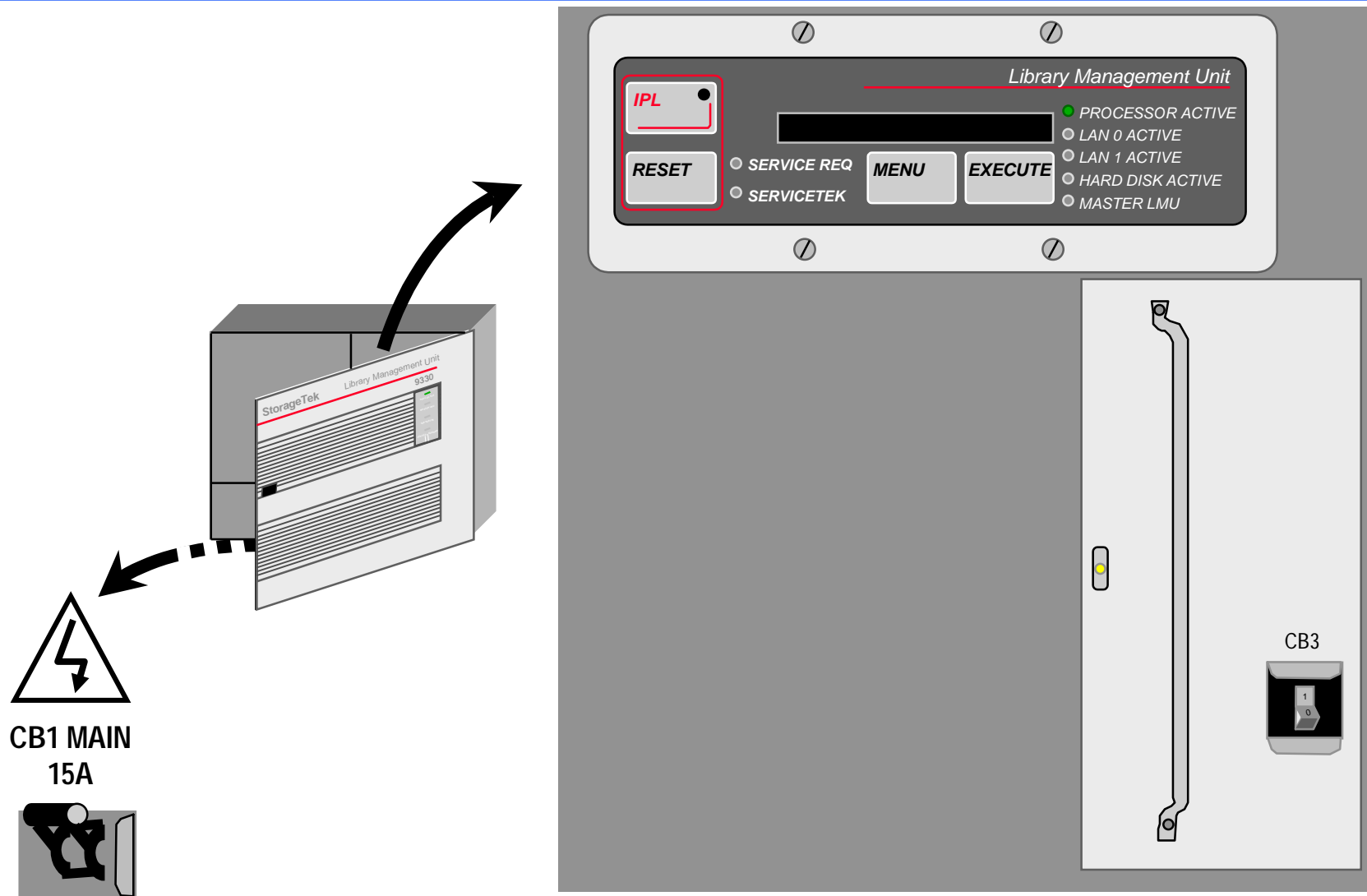
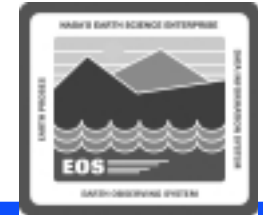
STK Controls/Displays: LCU



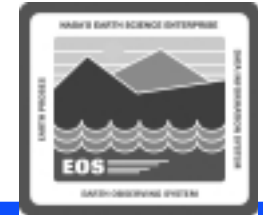
LCU:
Circuit Breakers
Inside Cabinet



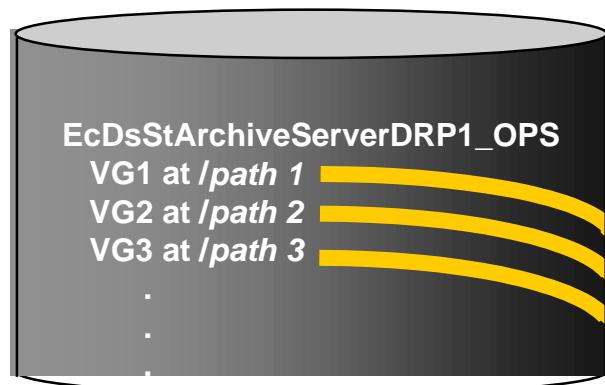
STK Controls/Displays: LMU



Storage Element Relationships

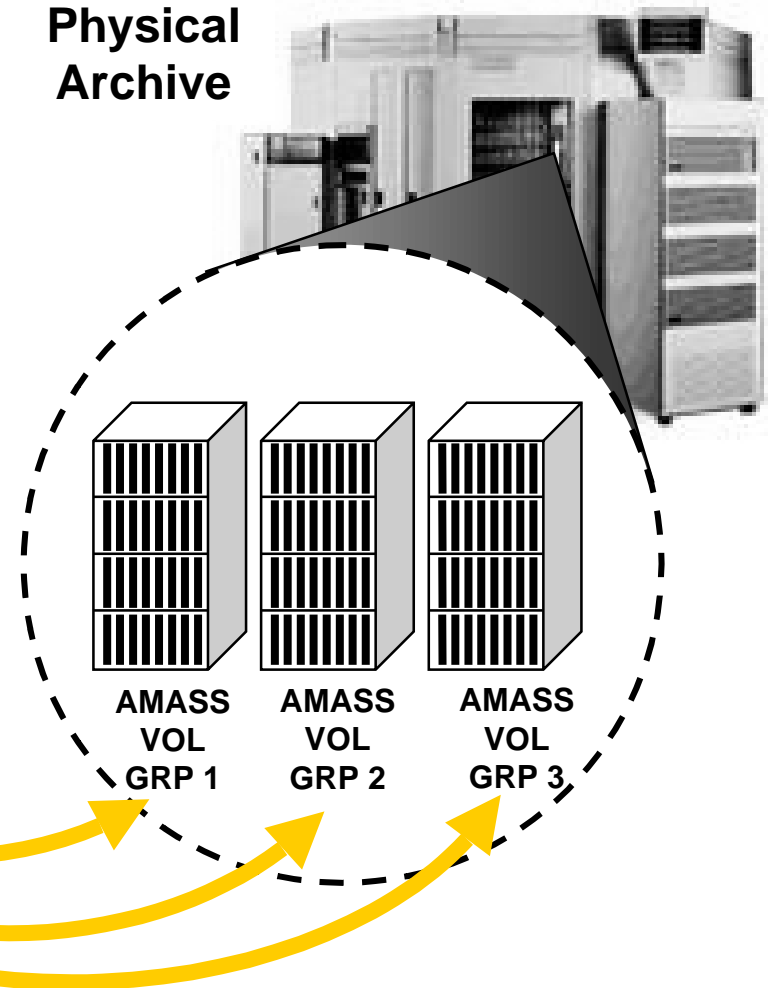


- Server Key (e.g., DRP1_OPS), mapped to a Cell Directory Service (CDS) entry (e.g., EcDsStArchiveServerDRP1_OPS)
- CDS group may include multiple Logical Volume Groups (LVGs), each with a specified path, mapped to a volume group in the physical archive

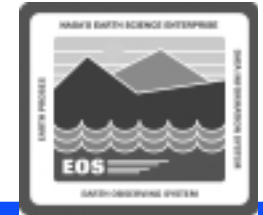


**Storage Management
Database**

**Physical
Archive**



Storage Management: Storage Config. Tab



Storage Management Control

File Options Backup Help

Wednesday February 16, 2000 11:00:32 AM Mode: TS1

Storage Config. Resource Schedule Cache Stats. Storage Events

Configuration Parameter Reporting

Server Type Information

Server Type	# of Servers	Description
3480/3490	0	3480/3490 Device Server
4MM TAPE	0	4MM Tape Device Server
8MM TAPE	1	8MM Tape Device Server
9TRACK	0	9 Track Device Server
ARCHIVE	3	Archive Server
CDR	0	CDR Device Server
D3	1	D3 Device Server
DISTRIBUTION FTP	3	Distribution FTP Server
INGEST FTP	3	Ingest FTP Server
PRINTER	0	Printer/Backup Client Server

View Servers

Specific Server Information

Server ID	Server Status
EcDsStArchiveServerACMI_TS1	OFF-LINE
EcDsStArchiveServerDRP1_TS1	OFF-LINE
EcDsStArchiveServerWKS1_TS1	OFF-LINE

Add... Modify Delete View Volume Group Info View Devices

Operator Messages

02/16/00 10:59:13 Old database entries were successfully purged.

Volume Group Information

Server ID: EcDsStArchiveServerDRP1_TS1

Volume Group Information

Volume Group Name	Current Volume Group Path
MOD01.001	/dss_stk1/TS1/mod11/
MOD021KM.001	/dss_stk1/TS1/mod11/
MOD02HKM.001	/dss_stk1/TS1/mod11/
MOD02QKM.001	/dss_stk1/TS1/mod11/
MOD03.001	/dss_stk1/TS1/mod11/
MOD04_L2.001	/dss_stk1/TS1/modhi/
MOD05_L2.001	/dss_stk1/TS1/modhi/
MOD10_L2.001	/dss_stk1/TS1/mod11/
MOD13A1.001	/dss_stk1/TS1/modhi/
MOD13A2.001	/dss_stk1/TS1/modhi/
MOD0001.001	/dss_stk1/TS1/modhi/

Find

Add... Modify Display History

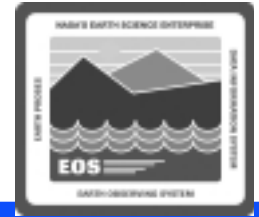
Volume Group History

Path History	Start Date	End Date
/dss_stk1/TS1/mod11/	05/14/99	

Find

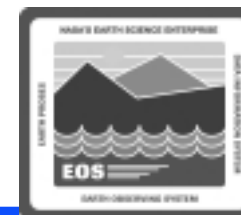
Close

Archive-Related Applications



- **Servers (must be running)**
 - **Science Data Server (SDSRV)**
 - **Storage Management (STMGT) Servers**
 - Staging Disk Server
 - Staging Monitor Server
 - Archive Server
 - Ingest FTP Server
 - Distribution FTP Server
 - D3 Tape Server
 - 8mm Tape Stacker Server
 - **Data Distribution (DDIST) Server**
- **DSS Graphical User Interface (GUI)**

DSS Science Data Server GUI: Data Types Tab, with Add/Update Dialogs



Science Dataserver Operator GUI – [TS1]

File Selected Options Help

Data Types System Requests

Science Data Server – Data Types

Data Type Information

ID	Name	Version	Description
:CL.000	CL	0	
ACM1_TS1:Browse.001	Browse	1	
DRP1_TS1:ACR3L2OM.001	ACR3L2OM	1	
DRP1_TS1:AIRI2REN.001	AIRI2REN	1	
DRP1_TS1:AIRX2RET.001	AIRX2RET	1	
DRP1_TS1:AIRX2SRD.001	AIRX2SRD	1	
DRP1_TS1:AIRX2SUP.001	AIRX2SUP	1	
DRP1_TS1:AIRX2TOP.001	AIRX2TOP	1	
DRP1_TS1:AIRXADCM.001	AIRXADCM	1	
DRP1_TS1:AIRXARYL.001	AIRXARYL	1	
DRP1_TS1:AIRXATCM.001	AIRXATCM	1	
DRP1_TS1:AIRXATCS.001	AIRXATCS	1	
DRP1_TS1:AIRXATLP.001	AIRXATLP	1	
DRP1_TS1:AIRXBPAR.001	AIRXBPAR	1	

Find

View Add... Update... Refresh/Reconnect

Operator Messages

Add Data Type

Descriptor Filename: File..

Archive ID:

Backup ID:

Offsite ID:

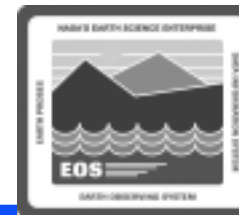
OK Cancel Clear Help

Update ESDT

Descriptor Filename: File..

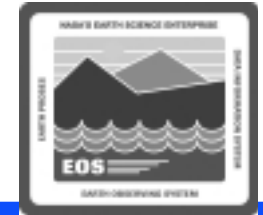
OK Cancel Clear Help

Archive Resource Management



- **For Science Software Integration and Test (SSI&T)**
 - At the time an Earth Science Data Type (ESDT) is loaded, its Archive ID is identified
 - e.g., DRP1_OPS:VG1
 - ESDTs may be uniquely assigned to logical volume groups
 - *Note:* The logical volume group is specified as the ESDT short name with the version ID as an extension (e.g., MODIS01.001)

Storage Management: Resource Schedule Tab



Storage Management Control

File Options Backup Help

Wednesday February 16, 2000 01:01:42 PM Mode: TS1

Storage Config. Resource Schedule Cache Stats. Storage Events

Storage Management - Resource and Device Scheduling

Resource Pool Information

Resource Pool Name	Number Devices	Number Online Devices	Current Queued Requests
SMM TAPE	2	2	0

Schedule Resource View Requests View All Requests

Resource Information

Request ID	Resource	Device Name	Device Status	Operational Status	Current Status	Current Operati
------------	----------	-------------	---------------	--------------------	----------------	-----------------

Schedule Device Stacker & Drive Status View Tapes Manage Tapes Find Tapes

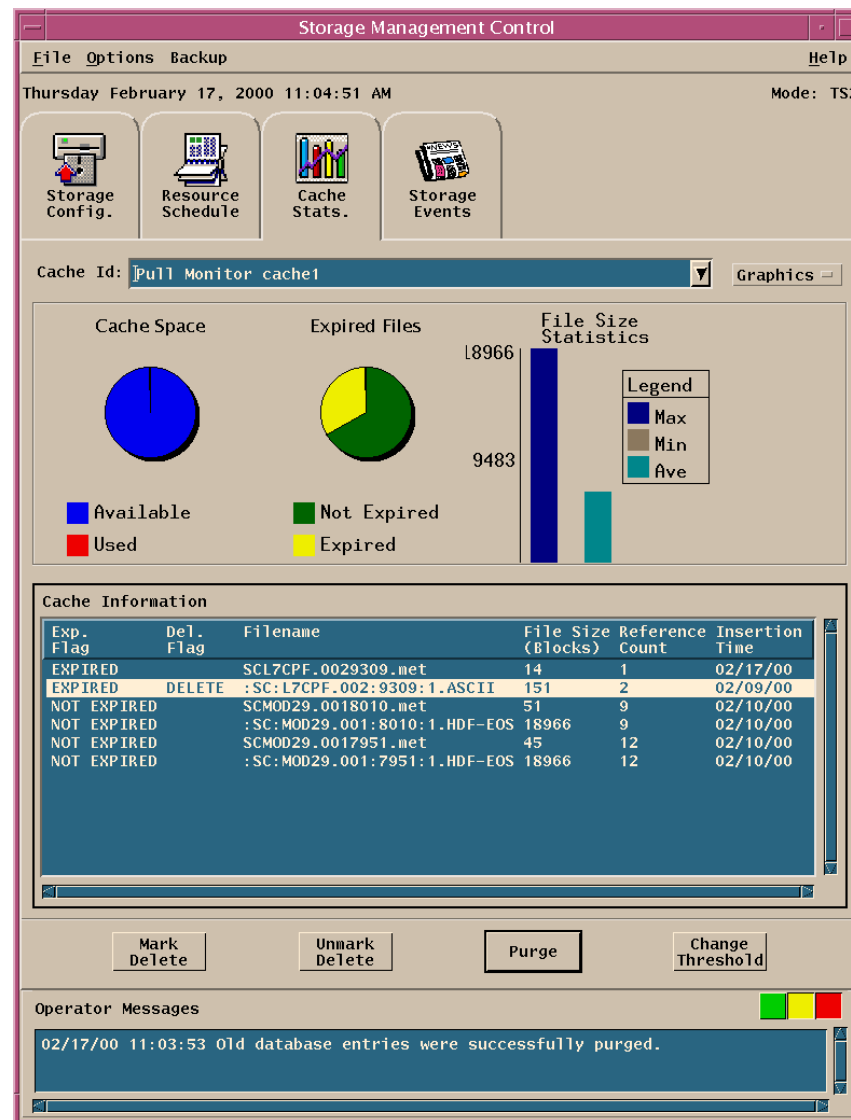
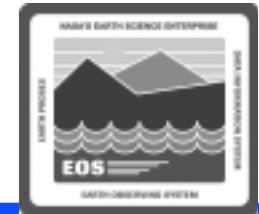
Tape Information

Tape ID	Tape	Location	Slot Number	Tape Status
---------	------	----------	-------------	-------------

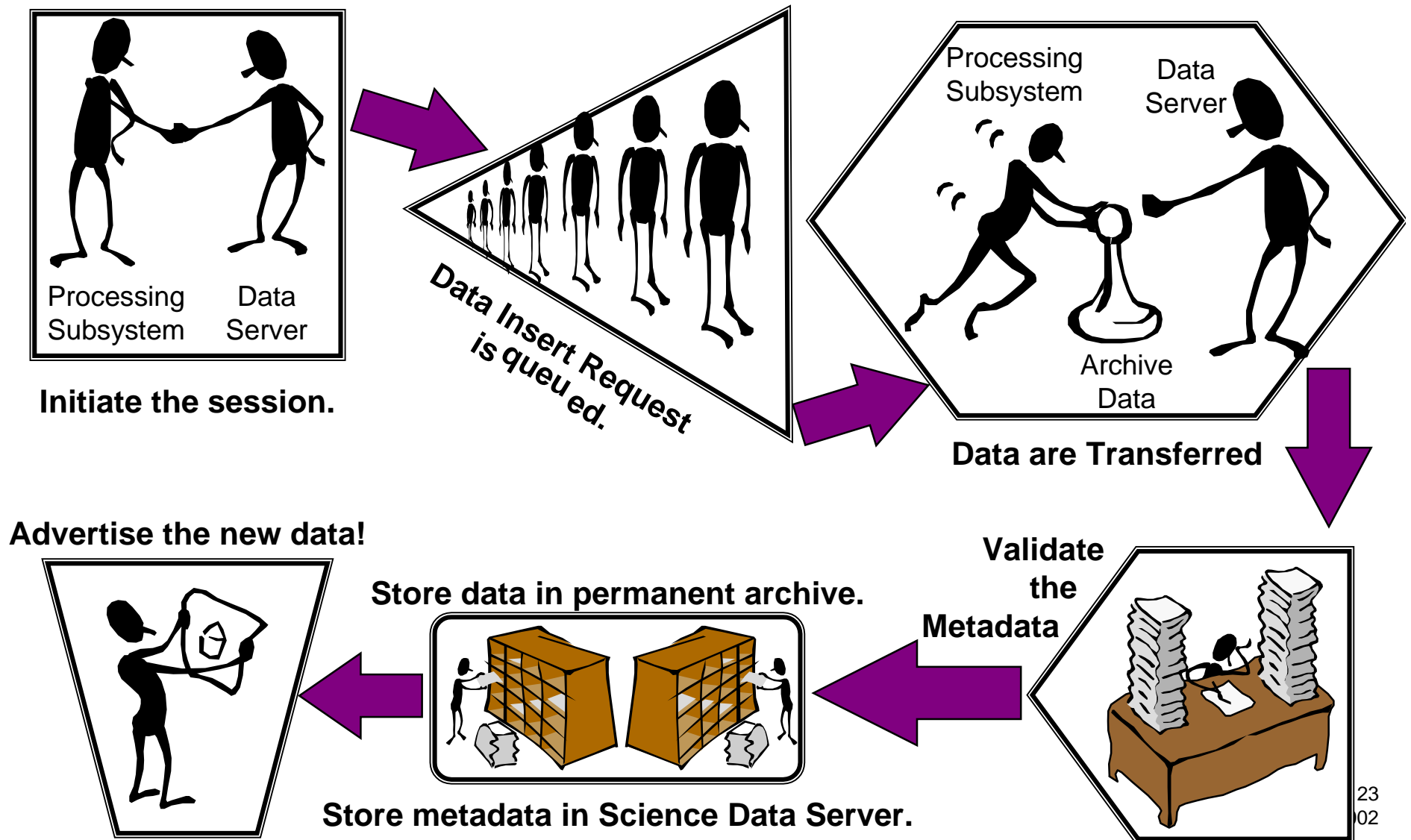
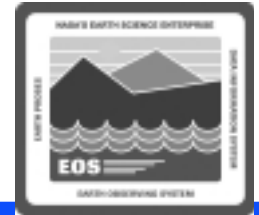
Operator Messages

02/16/00 13:01:19 Old database entries were successfully purged.

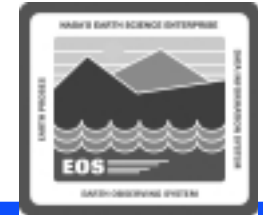
Storage Management: Cache Stats. Tab



Insert Data Into the Archive



System Management Requests Window



Science Dataserver Operator GUI – [TS1]

File Selected Options Help

Data Types System Requests

System Management Requests

System Management Requests

Request ID	Requester	Service Request	Status	Priority
f475a3a2-e404-11d3-a692-c676e810aa77:PDPS:PDPS non-persistent request		ACQUIRE	Executing	High
0b688e52-e488-11d3-bd0b-c676e810aa77:PDPS:		Add	Done	Normal
2dfe9684-e404-11d3-b3c8-c676e810aa77:PDPS:PDPS non-persistent request		ACQUIRE	Executing	High
7a2acfec-e403-11d3-bd0b-c676e810aa77:PDPS:PDPS non-persistent request		ACQUIRE	Executing	High

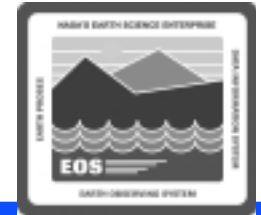
Find

Change Priority: Express Apply

Filter... Refresh

Operator Messages

System Management Filter Requests Window



System Management Filter Requests

System Management Filter Requests

☐ Request ID

☐ Requester

☐ All Requests

State:

☐ Submitted

☐ Queued

☐ Active

☐ Complete

Priority:

☐ Expre

☐ Very Hi

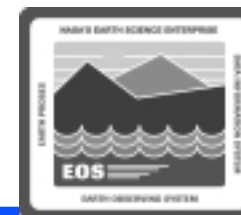
☐ High

☐ Normal

☐ Low

OK Apply Cancel Help

Data Server: Distribution Requests Window



Data Distribution Operator GUI – TS1

File Selected Edit View Options Help

Distrib'n Requests System Requests Tape IDs Preamble Editor Event Logging

Data Distribution – Track Activity

Data Distribution Requests Items: 12

Mod	Request ID	Requester	Esdt Type	Media	Priority	State	Status Mnemonic	Submission Time
<input type="checkbox"/>	0000000057	ECSGuest	AST_04.001	FtpPull	Normal	Cancelled	DsEstRequestCancelled	02/08/2000 19:
<input type="checkbox"/>	38194030890141	cmshared	AST_04.001	FtpPush	Normal	Cancelled	DsEstRequestCancelled	02/08/2000 19:
<input type="checkbox"/>	40162251599806	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 16:
<input type="checkbox"/>	40162251601126	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 16:
<input type="checkbox"/>	40162253100522	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 16:
<input type="checkbox"/>	40193629774881	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 19:
<input type="checkbox"/>	40193630937904	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 19:
<input type="checkbox"/>	4019363627040	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 19:
<input type="checkbox"/>	40193638911613	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 19:
<input type="checkbox"/>	40193641839677	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 19:
<input type="checkbox"/>	40193644947334	cmst1	MOD00.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/10/2000 19:
<input type="checkbox"/>	44173619562305	cmst1	MOD000.001	FtpPush	Low	Cancelled	DsEstRequestCancelled	02/14/2000 17:

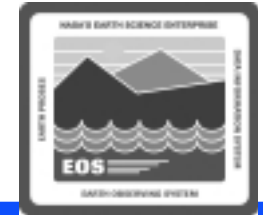
Find

Change Priority: Xpress Apply Refresh

Mark Shipped Cancel Suspend Resume Suspend All Resume All

Operator Messages

Distribution Filter Requests Window



Distribution Filter Requests

☐ Request ID

☐ Requester

☐ All Requests

Media Type:

☐ CD-ROM ☐ D3

☐ DLT ☐ Electronic Push

☐ 8 mm ☐ Electronic Pull

State:

☐ Pending ☐ Suspended

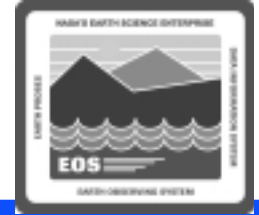
☐ Active ☐ Suspended with Errors

☐ Staging ☐ Waiting for Shipment

☐ Transferring ☐ Shipped

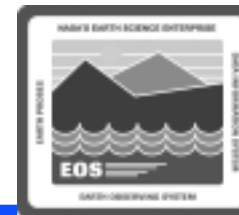
☐ Cancelled ☐ Failed

Retrieval of Data from the Archive



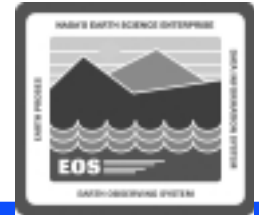
- **Largely automated process in response to data distribution requests**
 - data orders from scientists or other ECS end users
 - one-time orders
 - standing orders placed as subscriptions for acquiring data
 - data requests from other ECS sites
 - cross-DAAC orders for end users.
 - data needed as input for processing at other sites (subscriptions placed for ingest by those sites)
 - internal requests for data needed for processing
- **DSS Distrib'n Requests window to monitor**

Loading/Removing Archive Media



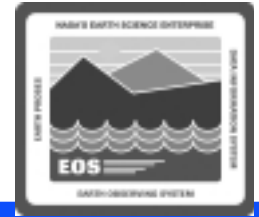
- **STK Powderhorn: Cartridge Access Port (CAP)**
 - 21 Tapes
- **Automatic loading (recommended for most loading)**
- **Manual loading (available for initial loading or other bulk loading)**

Archive Backups



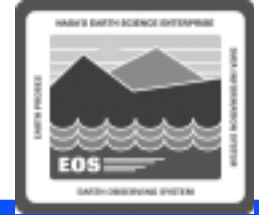
- **Programmatic backups are part of design requirements**
 - Active archive copy (use *Archive ID*)
 - Local backup storage copy (use *Backup ID*)
 - Off-site backup storage copy (use *Offsite ID*)
- **Archive manager needs to create volume group for offsite backups**
- **Selection of data for backup dependent on factors such as feasibility of recovery by other means (e.g., re-ingest, reprocess)**
- **Each site is responsible for arranging its own secure offsite storage**

Some AMASS Commands



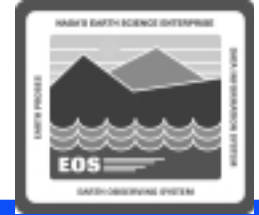
- ***vollist***
 - Lists all volumes and current status
- ***dirfilelist***
 - lists files under a specified directory
- ***volfilelist***
 - lists all files on a specified volume
- **Others: See *AMASS System Administrator's Guide***

Creating a Backup for AMASS



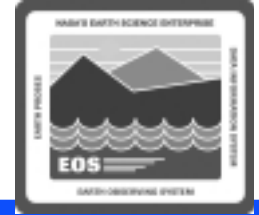
- AMASS tape format is proprietary, designed for speed of access
- *vgexport -q* command creates an ASCII file that can be used with the tapes and *vgimport* command to recover the stored data

Replace Backup Volume (Volume 1)



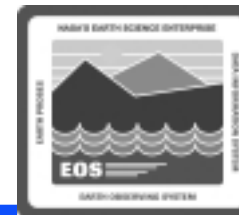
- **AMASS database backup is stored in the archive on Volume 1**
- **AMASS issues warning when Backup Volume is nearly full (95%)**
- **When warning message is received, install new Backup Volume and perform a full backup**
- **If Backup Volume gets full during attempted backup, backup will fail, necessitating replacement and full backup**

Manual Backup of Archive Data



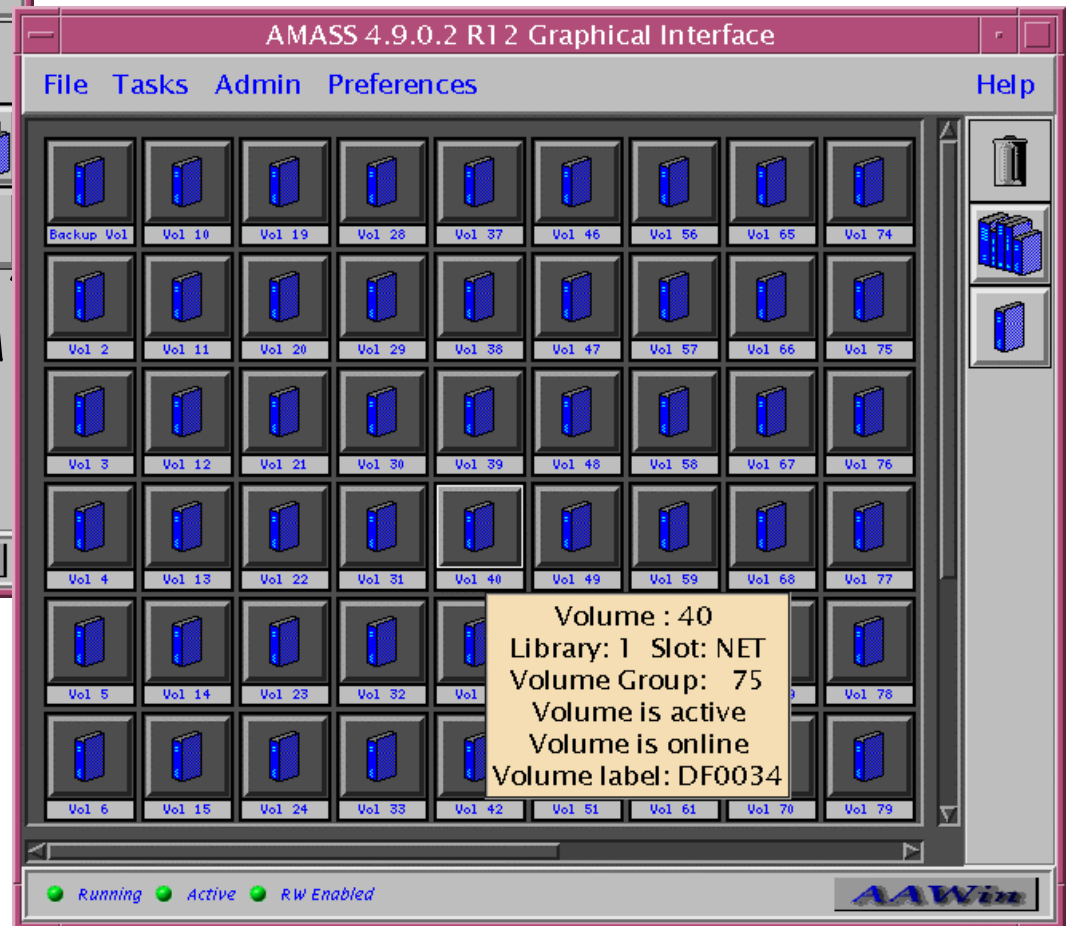
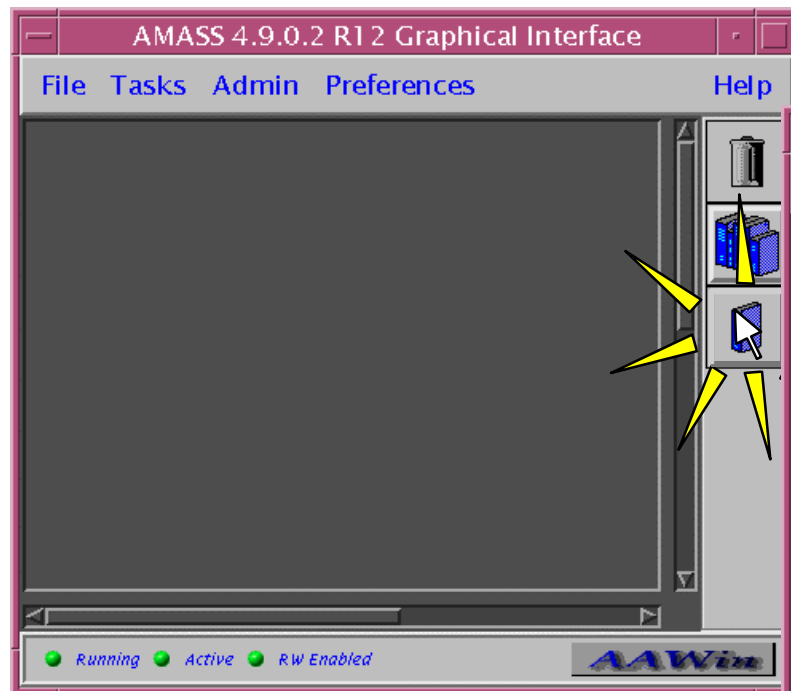
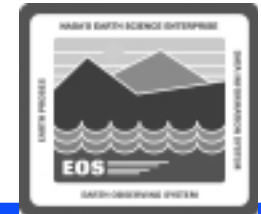
- **Necessary when a backup data tape is used and must be replaced**
- **Data restoration using a backup data tape is achieved by inserting the tape into the archive**
- **To replace the tape requires manual creation of a copy**

Restoring Archive Data

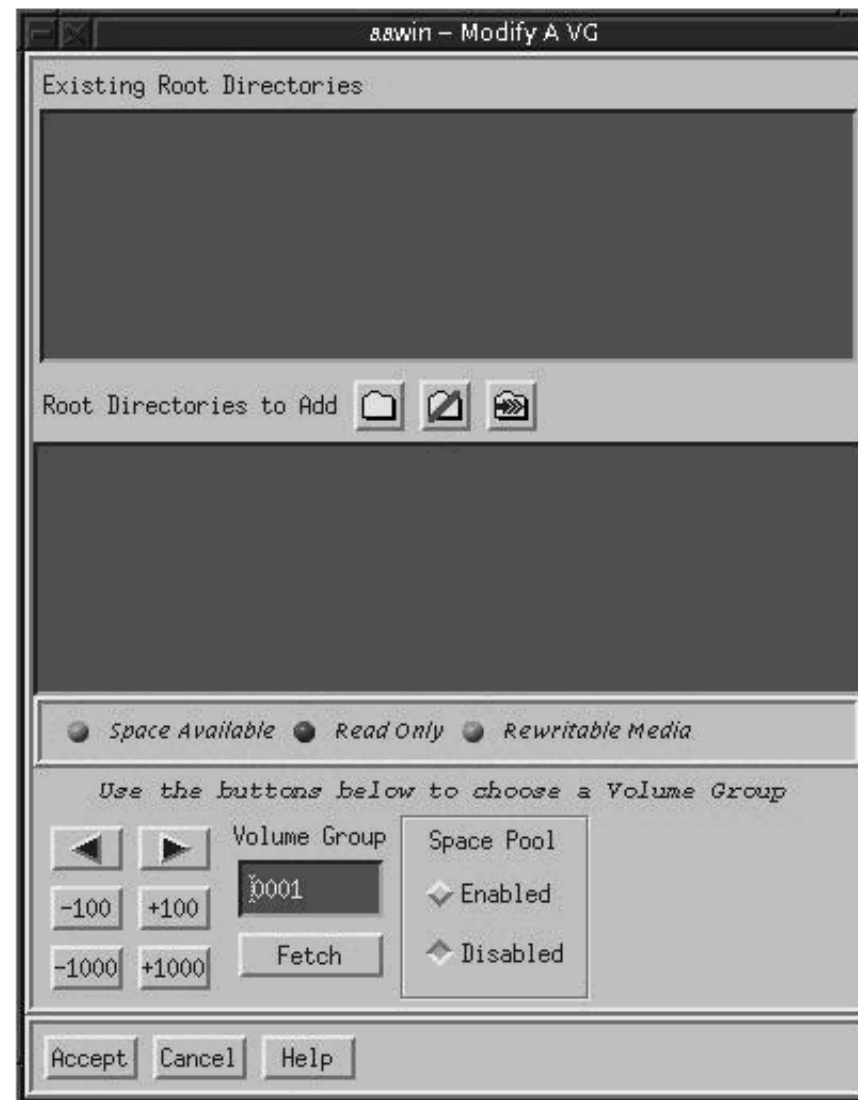
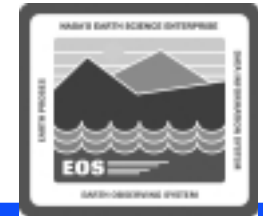


- **Copy from backup to primary (using UNIX)**
- **Reprocess lower-level data to obtain lost higher-level product**
- **Request replacement from data provider**
- **Restoring AMASS/ACSLS database**

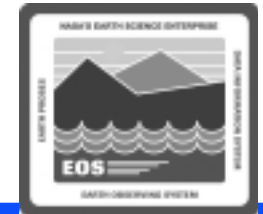
AMASS GUI



AMASS GUI: Modify A VG Screen



AMASS GUI: Modify A Volume Screen



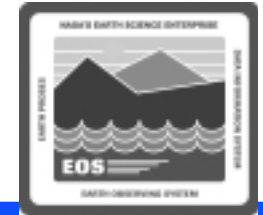
aawin - Modify A Volume

Volume	65	Slot	: NET
Volume Group	75	Library	: 1
Online	<input type="radio"/>	Format Type	: Yes
Active	<input type="radio"/>	Error count	: 0
Format Request	No	R/W status	: R/W
Block Size	16384	Volume in use	: True
Volume Label		Media type	: TAPE
		Last PBN	: 0x00000001
		Block size	: 16384
		Total blocks	: 1220672
		Blocks Used	: 1
		Dead space	: 0%

DF0059

Accept Cancel Help

Storage Management: Storage Events Tab



Storage Management Control

File Options Backup Help

Thursday February 17, 2000 11:07:19 AM Mode: TS2

Storage Config. Resource Schedule Cache Stats. Storage Events

Event Log Search Parameters

Date Interval: Begin 02 / 17 / 2000 End 02 / 17 / 2000

Event Type: Any Event Level: Any

Message:

Search Clear Parameters

Search Records Found: 2

Event Log

Number	Date	Level	Type	Message
30105	02/17/00	SEVERE	SOFTWARE	Error in restore from Backup sources in Archive
30105	02/17/00	SEVERE	SOFTWARE	Error in Archive Retrieve using primary path, s

Purge Selected

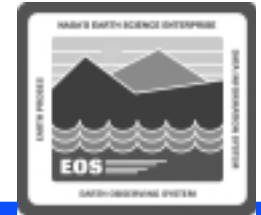
Operator Messages

02/17/00 11:03:53 Old database entries were successfully purged.

Event Type: Any
Device
Cache
Software
COTS
Sybase
Pulldisk
Unknown

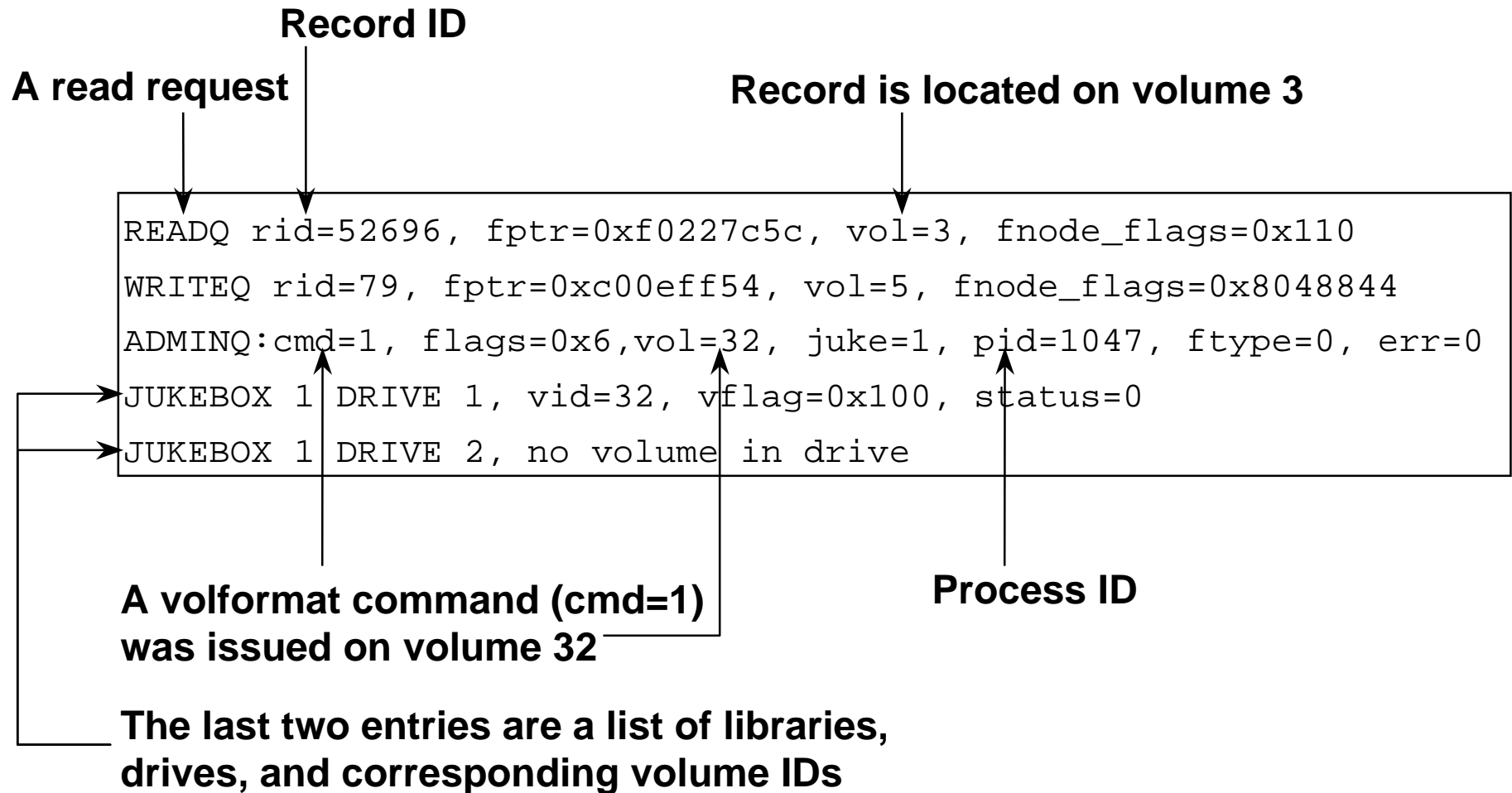
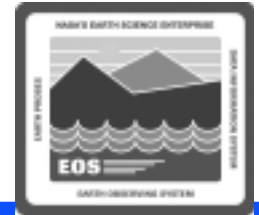
Event Level: Any
Information
Warning
Error
Severe
Fatal
Unknown

AMASS Monitoring Commands, Utilities, and Scripts

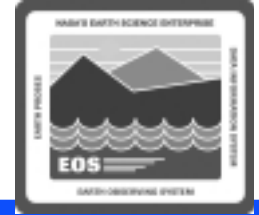


- ***sysperf*** is a command to display AMASS I/O activity
- ***amass_log*** is a script permitting display of AMASS messages from the system log
- ***quedisplay*** is a library utility used to view the AMASS queue and diagnose problems
- ***medialist*** shows robot's view of media and their slot locations
- ***mediamove*** can establish synchrony between ***quedisplay*** and ***medialist***
- There are other utilities and scripts described in ***AMASS System Administrator's Guide***

Sample Output from *quedisplay*

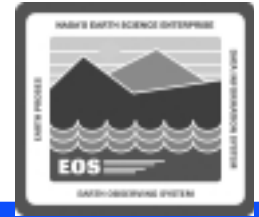


Recovery from Failure to Store Data



- **Storage failure may result from file copy errors**
 - Network problems
 - Mount point problems
 - AMASS unavailable (e.g., off line)
- **Use *amass_log* script to display errors**
 - Corrective action from *AMASS System Administrator's Guide*
 - Resume action

Checksum De-activation



- **System design incorporates calculation of checksum on granule insertion**
 - Supports detection of data corruption
 - Comparison of original checksum with checksum calculated on data retrieval from the archive
- **De-activation of checksum calculation may improve system throughput**
 - Compromises detection of data corruption
 - Partial alleviation by comparison of checksums calculated on sequential data retrievals